Doctoral thesis

Title: A mathematical study of symmetric structures inspired by soft matter systems: the QTZ-QZD family of triply-periodic minimal surfaces and doubly-periodic knitted fabrics¹.

Advisor: Dr. Elisabetta A. Matsumoto, Assistant Professor, The School of Physics, Georgia Tech, GA-30332, USA.

Education

PhD in Physics. Georgia Tech, Atlanta, GA-30332, USA
August 2015 - Present

Masters in Mathematics. Georgia Tech, Atlanta, GA-30332, USA
August 2015 - Present

Integrated Masters of Science in Physics. UM-DAE Centre for Excellence in Basic Sciences, Mumbai, Maharashtra, India.
August 2009 - July 2014

Professional Experience

Graduate Research Assistant, The Department of Astronomy & Astrophysics, Tata Institute of Fundamental Research, Mumbai, Maharashtra, India.
August 2014 - July 2015

Graduate Research Assistant (GRA), The School of Physics, Georgia Tech, GA-30332, USA
Spring 2017, Summer 2019 & Fall 2020 semesters.

Graduate Teaching Assistant (GTA), The School of Physics, Georgia Tech, GA-30332, USA
August 2015 - July 2020

Publications


¹pending completion.
Scholarships & Awards

2019  STAMI Graduate Fellowship\textsuperscript{a} awarded by Science & Technology of Advance Materials & Interfaces (STAMI), Georgia Tech for excellence in research.

2019  The Scientific Travel Award (STAP)\textsuperscript{b}, Science & Technology of Advance Materials & Interfaces (STAMI), Georgia Tech.

2017-20  Amelio Endowment Travel Award, The School of Physics, Georgia Tech.

2017-20  Graduate Conference Fund\textsuperscript{c}, Student Government Association (SGA), Georgia Tech.

2017-20  Doctoral Student Travel Supplement, College of Natural Sciences, Georgia Tech.

2011  Certificate of Appreciation, National Board of Higher Mathematics (NBHM), Government of India for excelling in the Madhava Mathematics Competition (MMC).\textsuperscript{d}

2009-14  DST-INSPIRE scholar\textsuperscript{e} – a scholarship awarded as a student stipend to pursue the Integrated Masters of Science program.

Oral & Poster presentations


- Minimal surfaces & knots. Seminar, School of Science and Technology, Physics, Georgia Gwinnett College, Lawrenceville, 30043-GA, October 2020.


- A topological perspective on knitted fabrics. APS march meeting, Boston, MA, USA, March 2019.

- A study of knots & links derived from doubly periodic knitted fabric patterns. Geometry Topology Student Seminar, the School of Mathematics, Georgia Tech, Atlanta, GA, USA, 6 November 2019.


- The QTZ-QZD surfaces: A family of chiral triply-periodic minimal surfaces derived from the quartz network. Poster presentation, The 11th Southeast meeting on Soft Materials, Emory University, Atlanta, GA, USA, May 2018.


- The QTZ-QZD surfaces: A triply-periodic family of chiral minimal surfaces from space group symmetries. Oral presentation, Southeastern Undergraduate Mathematics Workshop, School of Mathematics, Georgia Tech, Atlanta, GA, USA, August 2017.


• A chiral minimal surface family from space group symmetries. APS March meeting, New Orleans, LA, USA, March 2017.

• The QTZ-QZD surfaces: A family of chiral triply-periodic minimal surfaces derived from the quartz network. Oral presentation, Soft Matter Research Chat, School of Physics, Georgia Tech, Atlanta, GA, USA, 2017.

Conferences & Workshop Activity/Participation


[2] APS March meeting, March 2020.\(^2\)


[9] Summer school on soft solids & complex fluids, University of Massachusetts, Amherst, MA, USA, May 2018.


\(^2\)I attended some of the DSOFT, DPOLY and GSNP sessions virtually since the onsite conference was cancelled due to COVID-19 pandemic.
Research Experience


Professional Skills


Teaching Experience

[1] Introduction to Electromagnetism: 2015 fall semester, 2016 spring semester, 2016 summer semester, 2016 fall semester, 2019 spring semester and 2020 summer semester (online teaching).


Service to Profession

[1] A reviewer for *The President’s Undergraduate Research Award (PURA)* proposals during summer semester 2019, spring semester 2020 and summer semester 2020.


Community involvement/Service

I have served, several times, as a volunteer at the fundraising events hosted by *Asha for Education* – a non-profit organization to facilitate education and empowerment of young women in rural and developing parts of India.

Professional Memberships


Miscellaneous

My doctoral thesis research topic was featured in the following science news articles:


References

[1] Prof Elisabetta A. Matsumoto, Assistant Professor, The School of Physics, Georgia Tech, Atlanta. Email: sabetta@gatech.edu.

[2] Prof Alberto Fernández-Nieves, Associate Professor, The School of Physics, Georgia Tech, Atlanta, GA-30332, USA. Email: alberto.fernandez@physics.gatech.edu.

[3] Prof Kurt Wiesenfeld, Professor, The School of Physics, Georgia Tech, Atlanta, GA-30332, USA. Email: kurt.wiesenfeld@physics.gatech.edu.

[4] Prof Jennifer Hom, Associate Professor, The School of Mathematics, Georgia Tech, Atlanta, GA-30332, USA. Email: jhom6@math.gatech.edu.

[5] Prof Gerd Schröder-Turk, Associate Professor in Mathematics & Statistics, The School of Engineering & Information Technology, Murdoch University, Murdoch WA 6150, Australia. Email: gest73@gmail.com.